

**FIRE PUMP DESIGN INTENT**  
**1999 NFPA 20 and 2002 NFPA 13**  
**(To Accompany Architectural Review)**

Circled items require revision or clarification by contractual documentation (i.e., revised drawings, specifications, addenda, etc.) before plans can be approved. Letters are not acceptable. Design intent must be submitted by a fire protection sprinkler system engineer or architect.

**I. ARCHITECTURAL**

1. The fire pump room must be separated from all other spaces of the building by two hour rated construction. The rating may be reduced to 1-hour if the building is fully sprinklered with a NFPA 13 system. [NFPA 20 2-7.1.1]
2. Provide heat (NFPA 20 2-7.2), lighting (NFPA 20 2-7.3), emergency lighting (NFPA 20 2-7.4), ventilation (NFPA 20 2-7.5), and a floor drain in the pump room (NFPA 20 2-7.6).

**II. MECHANICAL**

1. Provide a plan and a cross section of the fire pump room. Identify any equipment that is not fire pump related (plumbing, mechanical, electrical, etc.).
2. Identify the fire pump manufacturer and model with pump and driver ratings. Identify the manufacturer of the controller, and transfer switches (if applicable).
3. All controllers and transfer switches shall be specifically listed for electric-motor driven fire pump service. [NFPA 20 7-1.2.1]
4. Provide a fire pump system schematic showing all system components including valves, tamper switches, check valves, controllers, pumps, bypass, test header, suction and discharge line. If the system supplies standpipes and sprinklers, show all main system components on the schematic.
5. Provide a graph sheet showing the following information:
  - A. Water supply combined curve (i.e., separate fire pump and public water curves, and a third curve showing the combined pump and public water effect). [NFPA 13 Chapter 14, Figure A-14.3.2]
  - B. Verify that pump operation does not reduce suction pressure head below allowable per NFPA 20 2-9.3. Include pressure losses from the backflow preventer and meter if needed.
  - C. Verify that the water supply is capable of delivering 150 percent of the pump's rated capacity. [NFPA 20 2-1.5]
6. Show the fire department connection. It must be on the discharge side of the fire pump. [NFPA 13 6.8]

7. Provide a pump bypass per NFPA 20 2-9.4 and a means to test the pump per NFPA 20 2-14.
8. Provide a pressure relief valve per NFPA 20 2-13.
9. Provide a jockey pump per NFPA 20 2-19. Show check and control valves at the discharge piping, and a control valve at the suction piping. [NFPA 20 Figure A-2-19.3]
10. Each controller (jockey and fire pump) must have separate sensing lines and be located between the discharge check and control valves. [NFPA 20 7-5.2.1 and Figure A-7-5.2.1(a) & (b)] Show this on the plans and diagram/section.
11. For fire pumps in high-rise buildings where electric motors are used and the height of the structure is beyond the pumping capability of fire department apparatus, a reliable emergency source of power shall be provided. [NFPA 20 6-2] For reliable sources, see NFPA 20 6-2.3.
12. For earthquake protection seismic design requirements see NFPA 20 2-22.
13. Check valves and backflow prevention devices must be listed for fire protection service and when located upstream of the pump shall be located a minimum of ten pipe diameters from the pump suction flange. [NFPA 20 2-21]

### **III. ELECTRICAL**

1. Power for electric motor driven fire pumps must be from a reliable source or two or more independent sources, all of which must be in compliance with NFPA 20 6-2.
2. Where multiple electric power sources are provided, they shall be arranged so that a fire at one source will not cause an interruption at the other source. [NFPA 20 6-2.4.1]
3. Where power is supplied by a service, it must be arranged to minimize the possibility of damage by fire. [NFPA 20 6-2.1 and .2] Service-entrance conductors or fire pump feeder conductors must be physically routed outside the building and must be installed as service-entrance conductors in compliance with NFPA 70 Article 230. When routed through or under the building, it must be encased in concrete at least 2" thick. [NEC 695.6 (A), 230.6 (1), and (2)]
4. The power supply feeding the fire pump and accessories must be dedicated, and directly connected with no disconnect device to the power source. [NFPA 20 6-2, 6-3 and A-6-2.3] Except that a single disconnecting means and associated over-current protective device is permitted between a power source remote from the fire pump room and controller or transfer switch or listed combination of both. [NFPA 20 9-3.7.7.3] This disconnect must be supervised. [NFPA 20 6-3.2.2.2]
5. Where alternate power is supplied by an on-site generator, the generator must be located and protected in accordance with 6-2.1 and Section 6-6. [NFPA 20 6-2.4.2]
6. All controllers must be located close to the motor with access for servicing. [NFPA 20 7-2.1]

7. Transfer of power to the fire pump controller between the normal supply and the alternate supply must take place within the fire pump room. [NFPA 20 6-6.4]
8. Manual transfer switches may *not* be used to transfer power to the fire pump controller. [NFPA 20 7-8.1.2]
9. A fire pump controller may not be used as a junction box to supply other equipment (jockey or make-up controllers). [NFPA 20 7-3.4.4]
10. No remote device may be installed that will prevent automatic operation of the transfer switch. [NFPA 20 7-8.1.3]
11. All pump room wiring must be in rigid, intermediate, or liquid tight flexible metal conduit, LFNC-B or Type MI cable or other approved means. [NFPA 70 695.6(e)]
12. If the pump is not constantly attended, the controller must have connections to provide an audible or visual alarm in a constantly attended location for the following conditions [NFPA 20 7-4.7]:
  - A. Controller has operated into a motor running condition.
  - B. Loss of power to one of the phases on the line side of the motor contactor.
  - C. Phase reversal on the line side of the motor contactor.
13. Dry-type transformers installed indoors and rated 112 1/2 kVA or less shall have a separation of at least 305 mm (12 in.) from combustible material unless separated from the combustible material by a fire-resistant, heat-insulated barrier. [NFPA 70 450.21]
14. Individual dry-type transformers of more than 112 1/2 kVA rating shall be installed in a transformer room of fire-resistant construction. Unless specified otherwise in this article, the term fire resistant means a construction having a minimum fire rating of 1 hour unless either exceptions apply. [NFPA 70 450.21]
15. Electrical equipment rated for 1200 amperes or more and over 6 ft (1.83 m) wide, containing overcurrent devices, switching devices, or control devices, there shall be one entrance not less than 32 in. (810 mm) wide and 6 1/2 ft (1.98 m) high at each end of the working space. [NFPA 70 110-26 C(2)]. Both entrances shall open in the direction of the egress and be equipped with panic bars, pressure plates, or other devices that are normally latched but open under simple pressure. [2002 NFPA 70 110.26.C(2) and 2003 NFPA 101 7.2.1.2.4 ]
16. Individual dry-type transformers of more than 112 1/2 kVA rating shall be installed in a transformer room of minimum 1 hour fire-resistant construction, unless specified otherwise in article 2002 NFPA 70 450.21(B).